

PLAIN VIEW

Update for AWPM for Wheat

AWPM for Wheat is a pest management program for greenbugs and Russian Wheat aphids

Winter 2004



Above: A field of Ankor wheat, a type of resistant variety. To the left: A sign marking test plots in Colorado



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What's next for resistant varieties?

With the new strain of Russian wheat aphid that is present in Colorado, researchers at both Colorado State University and the USDA-ARS lab have joined efforts to help growers.

The Colorado State University (CSU) Wheat Breeding and Genetics Program conducts basic and applied research focused on the development of improved cultivars and germplasm with specific adaptation in the central High Plains region of the Great Plains.

Since the inception of breeding efforts in 1963, research has resulted in the development and release of many winter wheat cultivars for producers in Colorado.

A large component of the overall breeding effort

in recent years has been directed toward rapid deployment of genetic resistance to the Russian wheat aphid (RWA), an insect pest for which there were no known resistant varieties at the time of its introduction in 1986. Since 1994, five improved cultivars (*Halt*, *Yumar*, *Prowers*, *Prairie Red*, *Prowers 99*) carrying resistance to RWA have been released by CSU through the partnership with the Colorado Wheat Administrative Committee (CWAC) and the Colorado Wheat Research Founda-

tion (CWRP).

Unfortunately, all of these previously RWA-resistant varieties are susceptible to the new strain of RWA identified in Colorado last spring. Researchers at CSU and the USDA-ARS are working on the development of wheat germplasm and varieties that are also resistant to the new strain. Preliminary tests have positively identified resistance in some breeding lines already in the pipeline. Hopefully, this see Resistant, page three



Our project is a collaborative effort, teaming the USDA Agricultural Research Service with growers and universities in Texas, Oklahoma, Kansas, Colorado, Nebraska and Wyoming.

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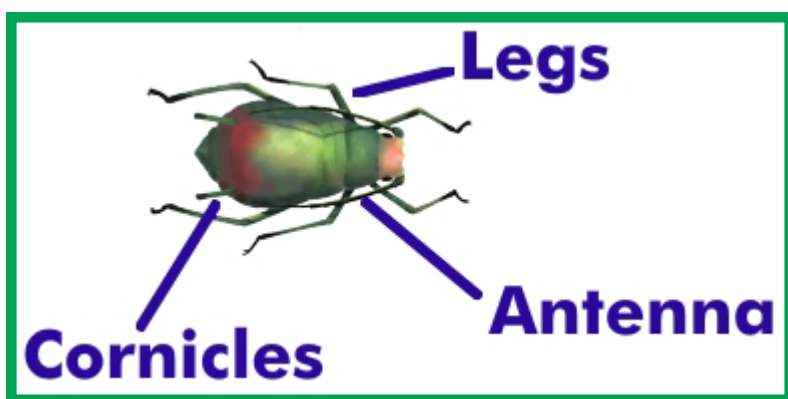
We welcome suggestions and contributions for future updates.

Glance 'N Go



This is part two of the three-part series.

Identifying Pests



Bird Cherry Oat Aphid

Physical Characteristics

Rhopalosiphum padi

- Olive-green color, has a red orange patch surrounding the base of each cornicle
- "Old" aphids found in winter or early spring could be totally black in color, but will give birth to mature typical aphids in the spring
- Measures about 1/16 inch long

Damage

- Can reduce forage and grain yields.
- Does not cause visible symptoms in wheat but heavy infestations will cause plants to become sticky with honeydew
- Very efficient vector of the virus that causes Barley Yellow Dwarf disease

To access the Glance N' Go website, go to:

<http://entoplp.okstate.edu>

You can find the information under agricultural models and cereal aphids pest management.

Aphids can be found on wheat from emergence to harvest. They feed by inserting their needle-like mouthparts into the plant and sucking plant sap. Aphid numbers can increase seemingly "overnight" because they are all females, they give birth to live young, and they mature rapidly. One example, the greenbug can reach sexual maturity in seven days from birth, depending upon temperature.

Each adult greenbug can produce from 5-7 nymphs per day, for up to 30 days. They can also disappear just as fast, because they have natural enemies that help to control them and they are very susceptible to death from adverse weather. It is therefore important to scout for aphids at regular intervals in the fall and spring to determine their abundance in your fields. All aphids produce a winged form called alates, which is triggered by day-length, overpopulation, and food availability.

Because different aphid species cause variable types and levels of damage, it is important to correctly identify them. This will help to accurately assess the need for control. To identify aphids you need to understand their body structures. Besides the color and shape of the body, you should look at the antenna, legs and cornicles. The cornicles are twin-like projections that resemble exhaust pipes and are located on the upper rear of the aphid.

For more information on Glance N' Go, please contact Tom Royer at **405-744-9406**. For information on identifying pests, please see page 7.

Resistant, from page 1

will decrease the amount of time needed to get a resistant variety release out to producers.

Recently, breeding efforts focused toward development of hard white winter wheat varieties and varieties that carry a proprietary source of nontransgenic herbicide tolerance have resulted in the release of new varieties that are also being handled through the CSU/CWRF release mechanism.

In 1995, Colorado State University entered into a unique and innovative agreement with the Colorado Seed Growers Association and the Colorado Wheat Research Foundation to handle the release of new wheat varieties developed by the CSU Wheat Breeding and Genetics Program. Several varieties have been released under this agreement including the varieties mentioned to the right.

Ankor (fall 2002) - a Russian wheat aphid (RWA) resistant backcross derivative of the popular variety 'Akron'. Ankor carries the same RWA resistance gene (*Dn4*) as other CSU variety releases (e.g., Halt, Yumar, Prowers, Prairie Red, Prowers 99) while preserving the desirable features of Akron, including good fall and spring growth characteristics, excellent row closure, good shattering tolerance, and high dryland yields.

Above (fall 2001) - the first publicly developed Clearfield™ winter wheat variety, carrying tolerance to the imidazolinone class of herbicides. Clearfield™ is a unique production system from BASF Corporation that involves an herbicide-tolerant variety and the new imazamox-based herbicide, Beyond (not yet registered), for selective control of jointed goatgrass, cheat grass, feral rye and other tough grasses, as well as many broadleaf weeds.

Avalanche (fall 2001) - the first hard white winter wheat variety released by CSU for production in eastern Colorado. Hard white wheat is the newest wheat market class in the U.S. and promises to become a mainstay of central Great Plains winter wheat production.

What's Happening Around Economic Surveys and how they benefit

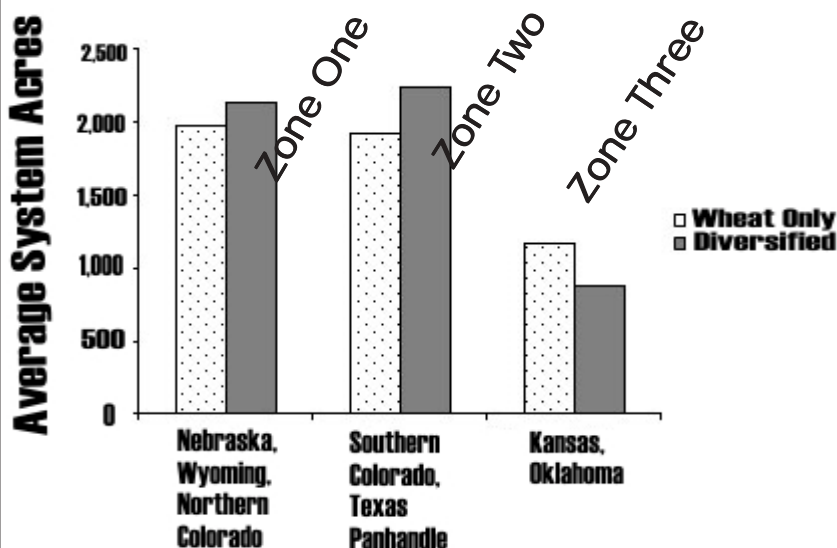
During our first year, we wanted to recruit wheat producers as participants in focus groups and cost-of-production interviews. This year, we have a total of 147 participants in six states.

We found you used cropping systems that vary by type of system and by zone.

You provided us with a broad range of dryland cropping systems. Collectively, participants had about 136,000 dryland acres in "wheat only" systems (wheat-fallow or continuous wheat) and 186,000 acres in "diversified" crop rotations. Future updates and reports will explore these systems and the occurrence of wheat pests in detail.

This winter we will be contacting each producer for second-year production interviews. We look forward to your input!

Cropping Systems in Project Zones



- Producers in the project collectively farm about 350,000 dryland acres in six states.
- Project producers planted over 180,000 acres of winter wheat in 2002.
- There were 66 different varieties planted by these producers. Jagger was the most popular variety in the south, with more than 39,000 acres planted in Oklahoma, Kansas, Texas, and Colorado.
- Buckskin was the most popular variety in the north, particularly Wyoming, and varieties carrying Russian wheat aphid resistance were widely used among Colorado participants.

Fall Feature team member:

University of Nebraska - Panhandle Research and Extension Center, Scottsbluff



Dr. Gary Hein is a Professor of Entomology and Extension Specialist.

His expertise is IPM research and extension as well as wheat disease transmission. He is also the Site Coordinator for Nebraska.

Dr. Drew Lyon is an Associate Professor of Weed Science, with expertise in weed ecology and management and extension. His role in the program is agronomic and weed evaluation for northern study sites. **Paul Burgener** and **Dave Christian** are conducting the economic interviews and analysis. Paul is an agricultural economist at the Panhandle Research and Extension Center, and Dave is his project assistant.



Dr. Gary Hein



Dr. Drew Lyon



Paul Burgener



Dave Christian

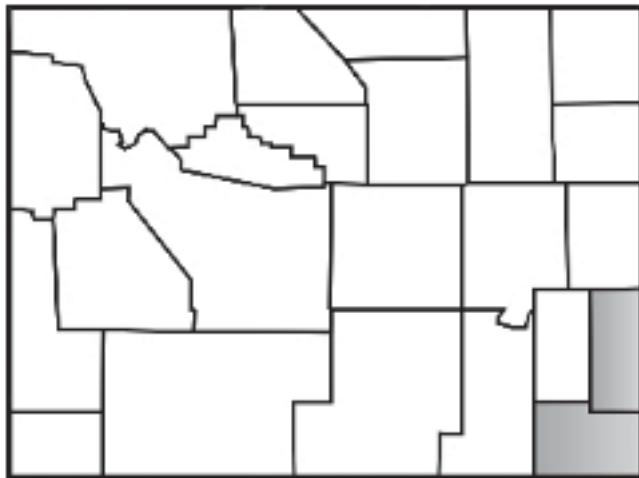
Thanks to those extension educators who help our project team

Extension educators Karen DeBoer (Cheyenne County, Nebraska) and Phil Rosenlund (Laramie County, Wyoming) assist our project team in working with local wheat producers. Thanks Karen and Phil!

Access Nebraska Cooperative Extension at <http://www.ckb.unl.edu/home>

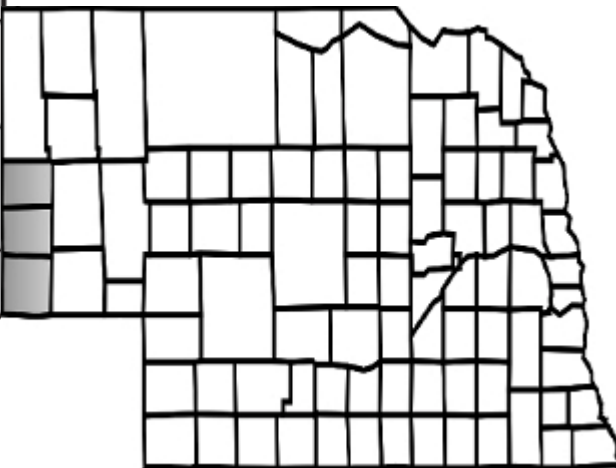
Access Wyoming Cooperative Extension at <http://www.uwyo.edu/ces/ceshome.htm>

Nebraska and Wyoming



Wyoming: In Wyoming, we have participating wheat producers in Goshen and Laramie Counties.

Nebraska: In Nebraska, we have participating wheat producers in Scottsbluff, Banner, and Kimball Counties.



A little about Nebraska...

According to the Nebraska Farm Bureau, Nebraska has 55,000 farms and ranches. The average operation consists of 855 acres and the average net income has ranged from \$28,000 to \$44,000 during the last five years. About one of every four Nebraska jobs is connected to agriculture. Each year, production agriculture contributes \$9.5 billion to the state economy. Nebraska's farms and ranches use 47.0 million acres – 96% of the state's total land area. Nebraska has nearly 23 million acres of rangeland, with half of it in the Sandhills in the north central part of the state. Corn, soybeans, winter wheat and sorghum are Nebraska's leading crops. About 14.5 million acres are used for these crops. Hay is produced on another 3.8 million acres. More than 40% of the feed grains grown in Nebraska are fed to livestock in this state.

A little about Wyoming...

With cash receipts near \$1.0 billion, agriculture is one of the top three industries in the Cowboy State along with minerals and tourism. Most people associate Wyoming with the famous bucking bronco that adorns license plates. In fact, cowboys help make cattle production by far the largest agricultural commodity in the State. Wyoming's cattle industry dates back to the middle 1800's when settlers first began crossing and settling the West. The high plains and mountain meadows of Wyoming are renowned for producing some of the finest cattle and sheep in the world. Wyoming ranks second in the U.S. in stock sheep and lamb crop and second in wool production. Wyoming wool is some of the finest and most desirable produced in the U.S.

Points of Interest



University of Nebraska Entomology Department

@<http://entomology.unl.edu/>

UN's Department of Entomology has a number of links helpful to growers. The site provides information about West Niles virus as well as grasshoppers. Check out the Field Crops Entomology page.

The Virtual Field Scout IPM Manual provides information about general agronomy, insects and other interesting information.

@<http://entomology.unl.edu/fldcrops/index.htm>

The Visual Media Library contains images and other information about bugs. The library contains video, charts and images. Also see the High Plains IPM Guide @ <http://www.highplainsipm.org>

@<http://entomology.unl.edu/visuals.htm>

Nebraska Cooperative Extension

The publications page of the site has a number of interesting topics, ranging from irrigation, farm management and pest control.

@<http://www.ianr.unl.edu/pubs/>

By accessing the Crop Watch, you will find timely information about pest and weed management, water resource information and much more.

@<http://cropwatch.unl.edu/>

Nebraska Organizations

These organizations in Nebraska provide information for growers.

Nebraska Wheat Board

A website for growers with information about economics, federal and state wheat policies and other important information.

@ <http://www.newheat.state.ne.us/>

Nebraska Wheat Growers Association

Their mission is to provide one strong voice for Nebraska's wheat and its growers. The website provides wheat and radio reports.

@ <http://nwga.unl.edu/>



Glance 'N Go Identifying Pests

Below are pictures and descriptions of common aphids in the AWPB region.

Greenbug

Physical Characteristics

Schizaphis graminum

- Lime-green colored
- Darker green stripe on its back
- Outer half of its antennae, outer half of its legs and the tips of its cornicles are black
- Mature greenbug measures about 1/16 inches long



Damage

- Causes yellowing of young wheat leaves
- Orange-red spots on the leaves of older plants
- Often occur in concentrated patches in the field
- Damage frequently occurs as small circular yellow patches in the field
- Can carry the virus causing Barley Yellow dwarf disease

English Grain Aphid

Physical Characteristics

Sitobion avenae

- Larger than the greenbug and has a "spidery" appearance because of its long legs and long narrow cornicles.
- The body is lime green, but the legs and cornicles are mostly black.
- The English grain aphid is 1/8 inch long when mature.



Damage

- More common in the late growing season
- Prefers to feed on the awns and wheat heads
- Is a vector of the virus that causes Barley Yellow Dwarf disease.

Russian Wheat Aphid

Physical Characteristics

Diuraphis noxia

- Lime green in color and "spindle shape" with a waxy coating that gives it a powdery appearance
- Has short antennae and no prominent cornicles
- Mature RWA is about 1/16 of an inch long



Damage

- Can cause serious injury and yield loss even at low levels because like the greenbug, it injects chemicals that affect plant growth
- As it feeds, causes the leaf to curl, creating an enclosure protecting it from climate, natural enemies, and insecticides.
- Symptoms become visible as white, yellow, or purple longitudinal streaks depending upon weather and climate.

Corn Leaf Aphid

Physical Characteristics

Rhopalosiphum maidis

- Bluish-green with short black cornicles and black antennae and legs
- More commonly found in corn and sorghum, but may be found on seedling wheat in the autumn or on mature wheat late in the growing season.
- Mature corn leaf aphid is 1/16 of an inch long



Damage

- It is a known vector of the virus that causes Barley Yellow Dwarf disease.
- Seldom reduces yields and generally does not require control
- The corn leaf aphid is not considered an economically important pest of wheat in Oklahoma.

Coming up this spring:
Expert Systems and Glance
N' Go

Areawide Pest Management for Wheat

Agricultural Research Service
1301 N. Western Road
Stillwater, OK 74075
www.pswcrf.ars.usda.gov/



that time!

Also, watch for summary reports and updates on our website @ <http://www.pswcrl.usda.gov/>

In the Spring 2004 Update: Cost-of-Production in-depth, Glance N' Go - Decision Support System, Comments from growers